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Management Regimes, Property Rights, and Forest Biodiversity in Nepal and India

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Abstract This article compares a range of initiatives aimed at involving people in the management of forest resources in Nepal and India. In Nepal, we focus on three categories of state-initiated programs: community forestry, the parks' buffer zone program, and leasehold forestry. In the southern Indian state of Karnataka, we study the state-initiated Joint Forest Planning and Management program along with older institutions of leaf manure forests (*Soppina betta*) and historical sacred forests (*Kans*). We conclude that state-initiated approaches to involving communities have been limited, at best, promote standardized and relatively inflexible management practices, and lead to partial improvement in biodiversity and people's livelihoods. When management is initiated and owned by the community, as in the case of sacred groves in India, and when other conditions are appropriate, communities can have the opportunity to demonstrate their capacity for putting effective and adaptive conservation practices in place.

Keywords Institutions · Biodiversity · Community forestry · Joint forest management · Sacred groves · South Asia

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Introduction

Decentralization of natural resource management has emerged as a growing trend in nations across the world (Bray and others 2005). With the professed goal of creating "win-win situations" where conservation goes hand in hand with development, decentralized, local, and participatory forms of governance are increasingly being encouraged — at least on paper (Ribot 2004). In comparison to the heavily top-down state-centered systems of management that were extensively promoted in the 1950s, these methods of governance are now being promoted with great enthusiasm as panaceas for developing countries (Agrawal and others 1999; Kellert and others 2000). This is particularly visible in the forestry sector, with increasing concerns about forest degradation.

Forest management poses a particular challenge in the densely populated landscapes of South Asia, dominated by rural settlements with high dependence on forest products (Agrawal 2005; Ostrom and Nagendra 2006). Complex traditional religious, caste, and ethnicity-based methods of forest management overlap with top-down state strategies of community involvement in these regions (Sundar and others 2001). A careful comparative study of the variety of forest management systems in this region can prove instructive in understanding the impact of these diverse property rights systems on forests and people (Ostrom and Nagendra 2006). These countries have dealt with forest management in rather different ways. While Nepal has taken a lead in initiating innovative policies of community forestry among developing countries in recent times, the Indian government has initiated Joint Forest Management initiatives with a much wider spatial reach but much less devolution of power (Chaudhary 2000; Sundar and others 2001). These top-down approaches to involving communities with forest

management overlap with, and are often superimposed on, traditional systems of resource sharing that have developed over at least several decades (Messerschmidt 1987; Chandran and Hughes 1997).

Although these resource-hampered countries have invested so much in programs aimed at community empowerment and devolution of management, the rhetoric of decentralization seems to be louder than actual practice (Agrawal and Ostrom 2001; Sundar 2000; Sundar and others 2001). Much controversy has been raised about the implementation and effectiveness of alternative scenarios of management in these countries, and few comparative empirical examinations of these issues exist (but see Agrawal and Ostrom 2001; Ostrom and Nagendra 2006). Drawing on over a decade of field research in these regions conducted by each of the authors, this article compares the practices and outcomes of community forestry, buffer zone management and leasehold forestry projects in Nepal with traditional and newly created systems of forest management in the state of Karnataka, India. Such comparative studies can prove instructive in understanding the types of property rights systems and participatory management practices that exist today across different countries, and their impact on forests and people (Moran and Ostrom 2005).

Nationalization, Decentralization, and Property Rights

Organized forest management on a large scale began in Nepal around 1880, with establishment of forest inspection offices and timber offices throughout the country. A central Forest Management Office was opened in 1924 at the national level, which was managed by the ruling Rana dynasty (Palit 1996). However, although these official structures and institutions did exist, most of the forests of Nepal were not under state control, but rather under community control prior to the mid-1950s. Traditional and indigenous practices of forest management were prevalent in the Nepal hills during this period (Messerschmidt 1987; Thapa and Weber 1995). Since population sizes were small, and forest resources relatively large, the pressures on the forests were nowhere near the levels which exist today.

After the fall of the Rana rule in 1950, these traditional land and forest holding systems were officially abolished. The Nationalization Act of 1957 brought all forest land, as well as all trees planted on private land, under government ownership. This control over forest resources was further emphasized by successive legislation, including the 1961 Forest Act, the 1967 Forest Protection Act and the 1970 Forest Product Rules (Shrestha 1998; Varughese 1999). Thus, local control over forest resources was replaced by a central governance system. Lack of forest ownership resulted in a lack of incentives for people to control the forest. The state control over the public forest lands was, however, rather weak and ineffective in regulating forest access: and in some cases, even corrupt, implicated in illegal extraction (Chaudhary 2000; Neupane 2000).

In India, prior to the arrival of British colonial interests in the late eighteenth century, rulers who controlled large tracts of forest land tended to concentrate their efforts on managing the more fertile agricultural plains and populated regions. Forests, for the most part, continued to be traditionally managed by local communities and princely states (Poffenberger and McGean 1996). While forests were state property, people's interests were protected by strong local institutions including the sacred forests documented across India (Malhotra and others 2001; Agrawal 2005). This changed with the arrival of British commercial interests, and the realization of the great commercial potential that the timber-rich forests of India held for the state. From a community resource, forests became a state controlled, restricted resource (Agrawal 2005). The Indian Forest Service was established under the Government Forest Act of 1865, following which, large tracts of forests were taken over and controlled by the state under the revenue department. In curbing local access to the forest, and denying traditional rights to harvest forest products, it fundamentally altered the relationship of the people to the forests, and changed traditional patterns of resource use (Gadgil and Guha 1995). Subsequent forest acts in the 1880s and 1890s continued to demarcate large stretches of forest land for commercial exploitation of timber, and traditional community rights to forest access and harvesting of forest products were steadily eroded (Poffenberger and McGean 1996).

After achieving independence in 1947, the remaining forested lands owned by small rulers and independent landlords were acquired by the State. Thus, independent India accelerated the commercial exploitation of forests, and led to an increase in commercial and industrial exploitation of forest and timber resources. In India, an estimated 97% of forested land is owned by the state. Between 1975 and 1998, the number of national parks and wildlife sanctuaries in India also increased sharply, with the majority of these "new" protected areas created from former reserve forest areas by upgrading the status of their protection. Thus, most areas that were set aside for protection are located in close proximity to human settlements, and tensions between conservation and development have been increasingly acute in recent years (Madhusudhan and others 2005; Shahabuddin and Rangarajan 2007). By 1990, forest cover had declined to the point where less than 10% of the country was under dense forest cover (Poffenberger and McGean 1996).

Thus we see that in both countries, traditional systems of forest management have been taken over and replaced by

state control of forests, and traditional access and harvest rights have been altered, controlled, and denied at country-wide scales (Poffenberger and McGean 1996; Sundar 2000; Agrawal 2005). In both countries, nationalization of forests is believed to have been a major factor resulting in the alienation of local communities from the forest (Bajracharya 1983; Gadgil and Guha 1995). As in many other developing countries, nationalization created open-access resources where previously, limited-access resources had existed (Ostrom 1990, 2005). With limited manpower and resources to safeguard these large stretches of forests that were now public property, monitoring government owned forests became difficult for the forest departments of both countries.

Prompted by an increasing awareness of these issues coupled with international shifts in policy, state administration in countries have begun to attempt to reverse this process since the early 1970s. After unsuccessful experiments with panchayat forestry in Nepal and social forestry in India, extensive attempts to engage the communities with forest management have been made in the form of community forestry and Joint Forest Management projects (Chaudhary 2000; Sundar and others 2001). However, as in most parts of the world, the model of community involvement has been largely conceptualized by national and state governments and national and international Nongovernmental Organizations, and mostly dependent on large volumes of funding channeled through external agencies (Sundar 2000; Ribot 2004). Although the Nepali community forestry program drew on traditional systems of community management, and the Indian program of Joint Forest Management derived inspiration from an experiment from West Bengal initiated by a local forester, the formal expansion of this program was largely mainly externally driven. Local actors have largely lacked control over the planning or implementation of these efforts (Sundar and others 2001; Rao and others 2002; Nagendra and others 2005a, 2005b). How do these top-down approaches compare with traditionally evolved systems of forest management in terms of property rights, tenure security, flexibility to change rules of management based on need, and outcomes in terms of impact on forest condition? This article summarizes results from over a decade of field research in India and Nepal to compare a range of forest management institutions, and evaluate their impact on property rights and forest condition.

Ownership of land is not a binary variable, and there are multiple kinds of property rights that an individual or a community possesses. Agrawal and Ostrom (2001) summarize previous research on the commons as having identified four categories of property rights that are crucial to understand common-pool resource management — withdrawal, management, exclusion, and alienation. In the context of forest resources, these can be described in more detail as the right to withdraw specified forest products from a defined physical area; the right to manage a forested patch, regulate use patterns, and make improvements; the right to determine exclusion, that is, to determine who has the rights to withdraw forest products and how this right can be transferred; and the right to alienate, that is, to sell or lease withdrawal, management, and exclusion rights. Drawing on Schlager and Ostrom (1999), they define four different categories of property rights holders depending on the nature of access and de facto rights to forests. Owners (such as former local rulers and the Indian and Nepali forest departments after nationalization of forests) have rights of withdrawal, management, exclusion and alienation. Proprietors (such as the plywood industries which were bestowed large tracts of forest land by the Indian Government after independence) hold rights of withdrawal, management and exclusion, but lack the authority to alienate these rights. Authorized claimants (such as the village forest committees in India) can withdraw forest products and manage the land, but lack the authority to decide who has access and to alienate. Authorized users (the most marginalized of communities) have the most limited rights, with only the right to withdraw specific forest products in practice, even though they may hold *de jure* rights to withdrawal.

We adopt this framework to compare property rights and ownership categories in six forest management regimes in Nepal and India. Our objective is to evaluate the differences in initiation and maintenance of these different regimes, and their impact on forest condition and conservation, and we extend this approach to evaluate outcomes for conservation. In Nepal, we discuss the three most widespread methods at involving communities with forest management, namely community forestry, leasehold forestry, and the buffer zone program.

In India, there is an immense variety of management regimes restricted to smaller geographic regions. We restrict our focus to the southern state of Karnataka, where the *Soppina betta* (leaf manure forests) and *Kan* (historical sacred forests) traditional systems of management form a very interesting contrast to state initiatives of Joint Forest Planning and Management (the regional version of the nationally well known Joint Forest Management program). Table 1 describes these six categories of forest management.

Nepal

Methods

The data used for this study came from part of a larger set of studies in Nepal, conducted using common research

Table 1 Property rights and forest condition across different management regimes

Country	India			Nepal		
Institution type	JFPM	*Betta* forests	*Kan* forests	Community forests	Buffer zone forests	Leasehold forests
Rights to withdrawal	Yes	Mostly restricted for use by the allotment holder since the management is private.	Yes, but very limited withdrawal takes place informally in these sacred protected forests. State or National forest laws can over rule local systems.	Yes	Yes, but limited to those forest products authorized by the fairly strict management guidelines provided to the community	Yes, but restricted to leasehold group members
Rights to manage	Yes, within the ambit of forest management regulations. Limited degree of control over modifications to management rules.	Yes. Private management by the allotment holder, but no rights to modify	Yes. Usually a committee of local users manage the forests based on traditional rule systems.	Yes, with a limited degree of control over modifications to management systems.	Yes, but very little no control over modifications to management systems.	Limited due to social conflict with nonmembers.
Rights to exclude	Limited: the Forest Department decides membership in consultation with the community. No authority to transfer rights to exclude.	Based on allotment to horticultural plantation owners in the 1920s to 1930s, by the British state. No authority to transfer rights to exclude.	Tradition and culture are the decisive factors for exclusion. Historically, the community decides transfer of rights to exclude.	Limited: the District Forest Officer decides membership in consultation with community. No authority to transfer rights to exclude.	Limited: the Warden decides membership in consultation with community. No authority to transfer rights to exclude.	Mostly unavailable due to high degree of social conflict with nonmembers. No authority to transfer rights to exclude.
Rights to alienate	No	No	No	No	No	No
Equity	In spite of a specific focus towards participation, women and lower castes often get marginalized.	Reserved for Arecanut plantation owners during British governance.	Context-specific exclusion of certain peoples at specific times of the year according to traditional norms	Women and lower castes often excluded from participation	Women and lower castes often excluded from participation	Reserved for low income households
Conflict	Varies, can be low to high degree of conflict with nonmembers	Varies, can be high with non-users	Varies, can be low to high degree of conflict with other faiths.	Varies, can be low to high degree of conflict with nonmembers	Low	High degree of conflict with non-members
External technical and financial support	High degree of external inputs from state and international aid agencies	Yes, since it is privately managed	None	Varies depending on location, low to high external inputs from state and international aid agencies	High degree of external inputs from international aid agencies	Varies depending on location, low to high external inputs from state and international aid agencies
Initial condition	Degraded forests with less than 25% canopy cover	Evergreen forests with closed canopy	Evergreen forests with closed canopy and high biodiversity	Often degraded	Varies from degraded to good quality forest	Extremely degraded forest

Table 1 continued

Country	India			Nepal		
Institution type	JFPM	*Betta* forests	*Kan* forests	Community forests	Buffer zone forests	Leasehold forests
Impact on forests	Degraded lands are improved, but often by planting monocultures of exotic species which results in an increase in biomass but mot in biodiversity.	Productivity oriented management	Continued conservation of species diversity. These forests often act as refugia for rare endemic species.	Regeneration in many parts in the middle hills, less so in the Terai. Improvement in biomass and biodiversity.	Regeneration in many parts, improvement in biomass and biodiversity	Low improvement in most areas due to high social conflict.

protocols developed by the International Forestry Resources and Institutions (IFRI) research program, and coordinated by Indiana University. The IFRI program is an interdisciplinary research network of 13 collaborating research centers in 11 countries (Ostrom 1998). The program was designed to facilitate the study of collective action for forest management, and now constitutes what is possibly the largest ongoing long-term research program and database documenting the factors affecting forests and the communities that use them.

Research forms were developed by a team of researchers using a combination of forest mensuration techniques and social science methods (Ostrom 1998). The interdisciplinary methodology developed for this purpose enables the documentation of attributes ranging from biophysical measures of forest and environmental conditions, to demographic and economic information, and data about institutions and rules that impact forest resources. This approach allows assessments of hypothesized relationships among demographic, economic, institutional, and biophysical variables. Further details about the IFRI research program are available at http://www.indiana.edu/ ~ ifri. In Nepal, the IFRI research program is coordinated and conducted by a team of social science and natural science researchers in the Nepal Forest Resources and Institutions research program, located in Kathmandu at http://www. Nepal@ifri.wlink.com.np.

Study Area

The IFRI program in Nepal has so conducted one-time visits and repeat visits in research locations carefully selected to maximize the coverage of biophysical and institutional variation in the country. Nepal can be divided into three distinct physiographic regions — the Terai plains, the middle hills, and the high mountains. There is significant biophysical, environmental, ecological, cultural, and institutional variation between these regions. We focus our discussion on the Chitwan inner Terai district in the Nepal plains, and the Kabrepalanchowk district in the middle hills of Nepal, two sites where community forestry, leasehold forestry, and buffer zone forestry programs have been extensively implemented in Nepal. In these two distinct physiographic regimes, we examine the three most predominant approaches to involving local communities with forest management, namely community forestry, park buffer zone management, and leasehold forestry programs. As there is limited forest cover in the high mountains, we do not consider this region in our discussion.

Community Forestry

Initiation

Nepal has experimented with various approaches to participatory forest management for decades, since the early 1970s. These early experiments, along with awareness of the negative impact of nationalization on forest cover, a growing appreciation for the capacity of local communities to manage common property institutions (Agrawal and others 1999), and increasing donor pressure, led to the introduction of the Community Forestry Act in 1993 (Thapa and Weber 1995; Varughese 1999). The major objectives of the community forestry policy are to hand over all accessible forests to user groups, which will have the right to manage and protect the forests and the right to all forest produce and income derived from these forests.

Community forestry has made substantial progress in terms of handing over of forests since its inception in 1993. By 2005–2006, 1,158,563 ha of forest area had been handed over to 14,227 forest user groups in the Nepal hills and plains, and the program covered over 1.6 million families spread across 74 districts (Government of Nepal 2006). However, most community forests are located in the mountains, where community forestry is generally believed to be successful (Gautam and others 2002; Webb and Gautam 2001). In contrast, there is much controversy about the impact of these programs in the Terai (Neupane 2000; Mahapatra 2001; Nagendra 2002, 2005a).

Formation and Management Rules

Based on the Master Plan for the Forestry Sector in 1988, the Forest Act of 1993 authorizes the District Forest Officer to hand over any part of a national forest to a user's group in the form of a community forest. Often where previously functioning community management initiatives are found to exist, the Forest department formally recognizes these by registering these communities. The procedure involves formation of a user group following an identification process, demarcation of a forest as a community forest, preparation of an operational management plan to be approved by the Forest Department, and finally, a formal handing-over of the forest to the user group to begin implementation of the operational plan (Shrestha 1998).

Our interviews indicate that in the majority of cases, user groups frame their own rules of extraction and management, and do have powers to adapt the rules to local circumstances. Communities are entitled to develop, conserve, and manage these forests and sell and distribute the products by independently fixing the prices. However, an operational forest plan needs to be first devised for this purpose, based on a detailed and exhaustive forest inventory, before the users are given permission to harvest and sell forest timber. The District Forest Officer has the authority to dissolve the user group at any time if dissatisfied with their management practices. Our interviews also indicate that in the majority of cases, user groups frame their own rules of extraction and management, and do have limited powers to adapt the rules to local circumstances.

Property Rights

All members of the user group have the right to access the forest, and the right to withdraw products based on the operational forest plan devised by the user group in conjunction with the District Forest Officer. The user group retains the right to manage the forests, although in community forests with high degree of external support, the management plans are often devised by external support agencies including nongovernmental organizations and the Forest Department. Within the community forestry user group, equity issues are of concern: high caste men have a greater say in the forest management plan than do lower caste groups and women (REFS). Since the District Forest Officer registers members of the community forestry user group (albeit in consultation with the local community), and retains the right to dissolve the group at any time, rights to exclusion are limited. The ownership of forest land, as well as certain high value timber trees on the land (notably, *Shorea robusta*) remains vested with the state, which therefore holds the right to alienate. Thus the community forestry user group can be considered at best a proprietor (who retains the right to exclude nonusers but lacks the authority to determine how this right can be transferred) and at the very least, an authorized claimant.

Impact on Forests

There is a high degree of variation in the amount of technical support received by user groups. While some groups receive substantial technical and financial support for planting trees, pruning and thinning and other management activities, other groups receive hardly any support. In contrast to the Indian forests, a large proportion of the trees planted in community forests are local trees that provide fodder, fuelwood, or nontimber forest produce useful to the community. In the middle hills, we find that community forestry has encouraged the regeneration of forest cover with an improvement in forest biomass and biodiversity levels in several instances (Nagendra and others 2005b). In the Terai plains, results have been more mixed, with the Forest Department handing over poor quality forests to the

local communities, and retaining the better quality forests as national forests (Nagendra 2002). However, we observe that community forests are now beginning to regenerate successfully in several parts of the Terai as well, after a slower start (Nagendra and others 2005a, 2007).

Buffer Zone Management

Initiation

Nepal has an extensive network of protected areas which cover over 15% of the country (Agrawal and Ostrom 2001). Most of these protected areas are established in regions where population densities are high, with five of these in the densely populated Terai plains. As a result, park-people conflicts have increased substantially in recent years, with significant impact on conservation. In 1980, the Department of National Parks and Wildlife Conservation was established to administer all protected areas. The Fourth Amendment to the National Parks and Wildlife Conservation Act, passed in 1993, provided the Department of National Parks and Wildlife Conservation (DNPWC) with the legal power to establish buffer zones in forested areas surrounding parks where forest resources are used on a regular basis by locals (Heinen and Mehta 2000). This program received extensive technical and financial support from the United Nations Development Program (UNDP) until the end of 2006.

The Chitwan National Park is Nepal's oldest protected area, and was established in 1973. This area was formerly managed as a hunting reserve for the royal family, and is now strictly protected by the Nepal Army. Local people are allowed to enter the park only for 10 days every year to collect building material (Stræde and Helles 2000). However, the park is surrounded by a population of nearly 300,000, and the severity of park-people conflicts that ensued from rigid park protection policies have led to efforts at conflict resolution in recent years. The DNPWC began implementing the Parks and People Program in the Chitwan and in other protected areas of Nepal in early 1995, to fulfill two primary objectives: socio-economic wellbeing of the buffer zone communities, and biodiversity conservation of the parks and their surrounding forests (Maskey and others 1999). In its second phase, the Parks and People program was later rechristened the Participatory Conservation Project.

Formation and Management

Buffer zone forests are delineated by the wildlife warden, and handed over to user group committees with the authority to manage these forests in accordance with the buffer zone management guidelines (HMG 1999). Several of the communities earn significant income from ecotourism (Schweik and others 2003; Bookbinder and others 1998). The buffer zone regulations and guidelines allow committees to maintain their own accounts, and 30–50% of the funds earned by these communities can be used for local community development (HMG 1999). However, these guidelines are rather restrictive in stating the percentage of funds to be allotted to different activities, and the warden at all times retains the power to stop projects. Although some of these user groups earn substantial incomes from tourism, the financial impact is believed to be limited on a per-household basis, and mostly limited to the forests near the main entrance of the park in Sauraha (Bookbinder and others 1998).

Property Rights

All members of the buffer zone user group have the right to access the forest, and the right to withdraw products based on the buffer zone management guidelines. Our interviews indicate that they do not have significant input into devising these guidelines, and lack the authority to modify them. For the most part, forest management plans are specified by the warden (in consultation with aid agencies and external consultants) and provided to the user group, who are supposed to implement the management plan, but lack the authority to modify it in any way to suit local conditions. As with community forestry, gender and caste equity issues are of concern within the user groups. The user groups retain the right to enforce exclusion. However, since the warden decides membership of the buffer zone community groups, and retains the right to dissolve the group at any time, the community lacks the authority to transfer rights of exclusion. The ownership of forest land, as well as certain high value timber trees on the land (notably, *Shorea robusta*) remains vested with the state, which therefore holds the right to alienate. The buffer zone management guidelines also specify how the money earned from the sale of forest products is to be spent, and the community needs to procure permission from the Warden who retains very tight control over harvest of forest products. Thus the buffer zone user groups can be considered at best an authorized claimant and at worst, in areas where the Warden retains very strict control over administration, only an authorized user.

Impact on Forests

In contrast to community forestry, the buffer zone program has received extensive financial and technical support from the UNDP. The parks warden provides detailed management

plans, with different sections of the forest planted with different kinds of trees. Extraction of timber and grazing is strictly curtailed, and local species of trees are planted within the forest to encourage regeneration. The presence of the Nepal army which patrols the adjacent park boundaries provides another deterrent to illegal extraction. As a result of this outside intervention, biodiversity and biomass in the buffer zone is significantly higher than in the adjacent community forests and national forests (Nagendra 2002; Nagendra and others 2007). However, users indicate that they are unable to make any modifications to the management guidelines, which are prescribed by the warden. There was a high degree of tenure insecurity owing to the fact that the UNDP project had a definite timeline of support which ended in December 2006. The implications of these aspects on the local communities, and the negative impact this can have on tenure security and forest conservation, are rather worrisome.

Leasehold Forestry

Initiation

The Hills Leasehold Forestry and Forage Development Project (henceforth referred to as leasehold forestry) was started in 1993. This program is in operation in 26 districts in Nepal, and in 2005–2006, there were as many as 2499 leasehold forestry user groups managing an area of 12,024 ha, with over 18,000 households covered by the program (Government of Nepal 2006). Under this innovative project, small groups of the poorest families are leased patches of degraded forest land for a 40-year period in order to provide them with a more assured supply of fodder, fuelwood, and other forest products. Examining the development of this innovative project will provide significant insights on the utility of such targeted approaches for poverty alleviation, and the manner in which they play out on the ground in developing countries.

Department of Forestry officials tend to argue that leasehold forestry is an effective complement to community forestry, especially in areas where both programs have been implemented together (e.g. see Malla 2000; Chapagain 2001; Post Report 2003). Nevertheless, in contrast to the comparatively greater amount of information on community forestry, very little is known about the impact of the leasehold forestry program on socioeconomic conditions and forest conservation in Nepal. Much of the area under leasehold forestry is situated in the middle hills of Nepal, which have supported local populations for centuries. This project seeks to alleviate the poverty prevailing in the rural households through restoration of ecological balance of the degraded forests in the hills.

Formation and Management

The project is designed to target small or marginal farmers who, with little or no cultivated land, and livestock as their major source of independent sustenance, are forced to encroach upon and exploit public forest lands for their essential fodder, fuelwood, and leaf-litter requirements. The project focuses on the integration of forestry and horticulture/livestock development. Two eligibility criteria are used to define the families included in this project: (a) ownership of less than 0.5 ha land, and (b) annual per capita income of Rs 3035 (about 40 USD at current exchange rates).

Previous research has indicated that there are significant conflicts between leasehold users and community forestry user groups, with community forest users often reluctant to acknowledge the exclusive rights of leasehold users over patches of forest (Thoms and others 2003). The effectiveness of the program in terms of poverty alleviation also remains questionable (Thoms and others 2006).

Property Rights

All members of the leasehold forestry user group have the right to access the forest, and the right to withdraw products. They also retain the right to manage the forest and devise management plans, often with technical consultation from the Forest Department and external aid agencies. Although the leasehold forestry program was developed as a complement to community forestry, we found that community forestry user groups are resentful of the separate allotment of land to leasehold groups (Nagendra and others 2005b). Leasehold groups are small, and consist of disempowered individuals from poorer sections of society: they are thus unable to enforce their rights, and face constant threats of encroachment from other nonmembers. The ownership of the land, as well as authority to harvest certain high value timber trees on the land (notably, *Shorea robusta*) remains vested with the state, which therefore holds all rights to alienate. Thus the leasehold user groups can be considered, at best, an authorized claimant. At worst, in areas where there is a high degree of conflict with adjacent community forestry users who control actual access to the forest, leasehold members are often only authorized users of their forest.

Impact on Forests

Under the provisions of the leasehold program, only the most degraded of forest patches are leased out to user groups. Thus, in the initial years, users are unable to

depend on these forests to supply them with timber, thatch, grazing, and other products. Across our study sites, we found consistent and widespread conflicts between group members and nonmembers over the utilization of forest products from the leasehold sites. While users have received technical support in some areas to plant trees and forage seeds to increase the productivity of the area, illegal harvest of forest products by nonmembers is a major problem in the area. The leasehold forestry members are unable to enforce their rights over their forest due to their being in a minority. They face several problems such as livestock owned by nonmembers being grazed in the leasehold forests, and planted seedlings taken away by nonmembers. These incidents have led to increased social conflict, and much insecurity and frustration among the leasehold forestry members (Nagendra and others 2005b). Despite these challenges, however, recent cross-site analyses indicate that forest protection and regrowth has taken place successfully in many leasehold forests (Thoms and others 2006; Nagendra 2007a).

India: Joint Forest Planning and Management

Methods

The data used for this study were collected by one of us (YG) as part of his doctoral research in the region. Forest plots in Joint Forest Planning and Management (JFPM) areas, *kan* (historical sacred forests) forests and *betta* (Leaf manure forests) forests in the Western Ghats region of Karnataka state were assessed to evaluate changes in species diversity and vegetation structure, using standard plot-based vegetation sampling techniques (Mueller-Dombois and Ellenberg 1974). In addition, for the JFPM project, we have drawn on extensive secondary data from the work done by Centre for Ecological Sciences, Indian Institute of Science, Bangalore, India (Rao and others 2001a, 2001b; Rao and others 2002). Detailed, open ended and in-depth interviews with various stakeholders, including those from the Forest Department, local plantation owners and farmers, and local inhabitants were supplemented by extensive archival research to gather information on tenure, forest rights, and forest use aspects (Gokhale 2002).

Study Area

In India, we focus on the Karnataka region of the Western Ghats hill chain, where recent state efforts at community involvement through the Joint Forest Management program coexist with traditional, longstanding arrangements between local individuals and the state in the form of leaf manure forests and sacred forests. The study covers two adjoining taluks (Indian administrative units nested within a district), Siddapur and Sorab — of two districts Uttara Kannada and Shimoga, respectively. The JFPM and kan field studies were conducted in two villages from Siddapur Forest Range of Sirsi Forest Division in Uttara Kannada district and three villages from Sorab Forest Range of Sagar Forest Division in Shimoga district. *Soppina betta* lands were assessed using data from six villages in the Siddapur Forest Range. In addition, we have also drawn extensively on secondary data and literature surveying the JFPM initiative in other places in Karnataka.

Joint Forest Planning and Management

Initiation

In Karnataka, Joint Forest Management was implemented in the form of the Joint Forest Management and Planning (JFPM) program. This program was intensively active in the Western Ghats mountain districts of Uttara Kannada, Shimoga, Chikmagalur, Kodagu, and Dakshina Kannada (Rao and others 2002). The JFPM program was initiated in 1993, and largely funded from a British (DFID) grant called "Western Ghats Environment and Forestry Project." The order on JFPM in Karnataka, issued in 1993, facilitated the formation of a democratic village level or even hamlet level organization called the Village Forest Committee (VFC). This committee is the basic and central unit of all activities related to JFPM. According to the JFM order, Village Forest Committees (VFCs) are to be established to manage the forests, and these VFCs are to be registered as societies under the Mysore Societies Act, 1960. However, in the present program they have been registered with the respective Deputy Conservator of Forests, thus increasing the authority of the state (Rao and others 2001a, 2001b). This program has been established with great rapidity. In Karnataka so far, 3887 VFCs have been established (http://karnatakaforest.gov.in/English/joinedforest_management/jfpm_pre.htm). Substantial VFCs are supported under externally funded Forest Development Programs in the State (Murali and others 2000; Rao and others 2002).

The sustenance of people's interests, actual benefits and the cost effectiveness of the program for the State Forest Department have been important to understand the performance of all efforts in context of JFPM in the Western Ghats of Karnataka. These programs were started at the initiative of the Forest Department, which had previously kept forest management out of the hands of local people. As with other large-scale projects, a significant proportion of the funds provided by international donor agencies was actually invested in large scale building and infrastructure

development rather than in community development (Rao and others 2001a, 2001b). In the initial phases of the project, only very highly degraded land (less than 25% canopy cover) was handed over to VFCs for management, but this has changed in 2000.

Formation and Management

The VFC is the basic and central unit of all activities related to JFPM. To enable this, VFCs are empowered to function as self governing, independent and financially viable bodies. The VFC is constituted with the village community as beneficiaries and the supportive government agencies and NGOs as nonbeneficiary members.

The VFCs formed by the Forest Department function within the ambit defined by government rules. The VFCs in our study area were initiated using the "entry point program" by the Forest Department. This program was used to help the Forest Department in building a rapport with people, and convincing them about the need to initiate the JFPM program. The Forest Department staff select the villages where JFPM was to be implemented, based on their perceptions of other ongoing activities in those villages. We have also come across instances where such preorganized communities have been reluctant to join the program, because they fear that this will cause them to lose control over their forests.

Property Rights

All members of the VFC have the right to access the forest, and the right to withdraw products. They also retain the right to manage the forest and devise management plans, in technical consultation from the Forest Department and external aid agencies. However, the membership of the VFC is decided by the Forest Department, albeit in consultation with the local communities, and this can often lead to conflicts with some sections of the community being excluded from membership. The ownership of the land, as well as authority to harvest certain high value trees on the land (such as sandalwood) remains vested with the state, which holds the rights to dissolve the VFC, transfer rights to exclude, and alienate. Thus the JFPM groups can be considered somewhere in between authorized proprietors (who retain the right to exclude but lack the authority to transfer these rights) and authorized claimants to the forest.

Impact on Forests

The JFPM program aims at involving local people in improving degraded forest lands, managing the forests and addressing local requirements of fuelwood, small timber, and nontimber forest products (NTFPs). Thus, this program is expected to result in conservation and improvement in natural resources to assure sustainability, address conservation of biodiversity rich pockets and finally, to understand and manage the linkages between local livelihoods and natural resources. As an initial policy, the scheme was implemented only on degraded forest lands and good forest patches were not considered. Hence, most of the sites have low species diversity and biomass levels. In the second phase of the program this restriction has been removed, and now good quality patches of forest can also be handed over to local communities.

The efforts have led to restore over 340,000 ha of degraded forests in Karnataka state. In several instances, however, rather than transferring multi-species forest areas to JFPM, plantations of *Acacia auriculiformis* initiated under the earlier programs of social forestry were transferred to JFPM to enhance protection to those plots. In these areas, where the forests are "managed" by planting exotic species instead of encouraging natural regeneration, the biodiversity levels continue to remain low, even where biomass levels are high.

Leaf Manure Forests (*Soppina bettas*)

Initiation

Soppina betta (hereafter referred as *betta)* forests are leased forests. These refer to forests where usufructory rights over branches, green manure, leaf litter, etc. are granted to those private managers having areca nut cultivations. Several such forest patches have been allotted to areca nut orchard owners, jointly or individually in Uttara Kannada, Shimoga, and Chikmagalur districts of Karnataka. These lands are owned by the State Forest Department and are managed by horticulturists. In response to local requirements for green manure for cultivation, this allotment was done during the British rule between 1920 and 1930. Later on, no new allotment of *betta* lands was done (Gokhale 2002).

Formation and Management

The *betta* forests have been constituted mainly to provide an assured source of leaf manure for the areca nut gardens in the Western Ghats of Karnataka (Bhat and Gadgil 1993). The details of rights and privileges associated with *betta* forests differ from district to district in the Western Ghats of Karnataka. But the common usufruct rights over extraction/pollarding of branches, twigs, leaves, and litter, as well as grazing and grass collection, are allowed. There

are de facto rights over commercial NTFPs as long as they are sold to the authorized contractor of the Forest Department (Shrinidhi and Lele 2001). The *betta* lands were provided in proportion to the availability of areca nut gardens in the Western Ghats of Karnataka. The proportions range from 6 to 9 acres (2.5 ha to 3.5 ha) of *betta* land per acre (0.4 ha) of areca nut plantation. These lands are mainly leased to individual families, but the land is owned by the Forest Department. Although attention was paid toward the needs of the local horticultural families while managing the land, the benefits accrued are shared with a relatively small number of beneficiaries.

Property Rights

The rights to access the forest and withdraw products have historically been restricted to the private horticultural orchard owners who were granted management rights by the British state in the early twentieth century (Gokhale 2002). This inequitable access has understandably led to much social conflict in the area leading to encroachment of adjacent natural forests for *betta* requirements for new areca nut plantations. The plantation owners retain the right to manage the forest and devise management plans, often with technical support from external consultants. However, they lack the authority to transfer management rights, and certainly lack the right to alienate. Thus, the plantation managers of *betta* forests can be considered authorized users, while the local communities can be considered, at best, authorized claimants; at worst, they lack even these most basic of access rights.

Impact on Forests

The distribution and access to *betta* forests has been discriminatory with preferential allotment to the holders of old plantations of areca nuts in the Western Ghats. There is no wholesale degradation of *betta* lands in Uttara Kannada, due to effective management and strong exclusionary practices (Lele 1993). However, it is this unequitable allocation of *betta* forest resources which has been largely responsible for the degradation of adjacent open access forests in the area by the resource-dependent local populations. The increase in the prices of areca nuts in the last decade prompted small farmers in areas neighboring the natural forests to convert their rice fields into plantations, leading to increased illegal encroachment on the natural forests for leaf manure. The recent trends of falling prices of areca nuts and various regional bans on *Gutakha*, a mixture of areca nut and tobacco popular in various parts of India, will impact this trend. We also find that JFPM provisions getting utilized for the improvement of *betta* forests in some villages. The impact of these changes on property rights and ownership regimes will be interesting to follow.

Although some researchers (Nadkarni and others 1989) suggest the withdrawal of *betta* privileges because of over extraction, this is not a likely proposition given the social and political visibility of many of the *betta* owners. Thus, following the example of other scholars (Lele 1993) we argue that the system needs to be revised to balance the rights of the local communities with the privileges of the *betta* managers.

*Kan*s (Historical sacred forests)

Initiation

*Kan*s are historical sacred groves and leased pepper gardens within patches of evergreen forests in the Western Ghats of Karnataka (Gokhale 2004). These forests are reported from Uttara Kannada district and Old Mysore State districts like Shimoga and Chikmagalur (Chandran and Gadgil 1993; Buchanan 1870). The British administration failed to recognize the cultural linkage of people with these sacred forest patches and leased these forests as pepper gardens. *Kans* as management regimes are no longer recognized by the Karnataka State Forest Department. But even today the old *kan* survey numbers can be traced with the help of the documents available in the State Forest Department such as Working Plans in Shimoga and Sirsi Forest Circles, Village Forest Register records documented during 1925–1930. Many *kans* are also physically noticeable even today as distinct patches of evergreen vegetation characteristic of the Western Ghats (Gokhale 2002, 2004).

These evergreen forests in Shimoga district were historically leased to local land lords mainly as spice gardens for tendering of wild pepper, cinnamon, and other commercially valued spices. In the pepper-rich Uttara Kannada district of Karnataka, there was considerable trade in pepper with the Portuguese and British, so much so that a 16th century queen of Gersoppa was known as the "Pepper Queen" to the Portuguese (Campbell 1883). Since wild pepper requires human attention for better yield, people took care of pepper vines in evergreen forest patches called "Maynasu Canu" meaning menasu *kan* or pepper *kan*. Such *kans* were intermixed with gardens and rice fields (Buchanan 1870).

This system was practiced until the mid-twentieth century (1966) in Shimoga district but was abandoned in Uttara Kannada district soon after the British administration took over forest management in 1800 A. D. Even today these *kan* forests can be identified due to their predominantly evergreen species composition and the fact that

they often have local deities associated with them and located inside the *kan* (Gokhale 2001).

Formation and Management

There has been a continued relationship of people and *kan*s through the worship of *kan*-associated local deities probably since the peopling of this part of the Western Ghats. The patches inside *kan*s even today harbor local deities like *Chowdamma, Jatakappa, Bhutappa*, etc. Brandis, the first Inspector General of India, surveyed the *kan*s of Sorab in 1868; at the same time, he toured through Kodagu district in southern Karnataka. In Kodagu, he noted a large number of sacred groves (*devarakadu*s) where forests were protected in the name of local deities. Interestingly though, he did not record the sacred values attached to *kan*s which were observed by Buchanan in 1801. Buchanan, while observing this, did not take it seriously and considered that the sacred values attributed to *kan* forests were a contrivance by local inhabitants, to be used as an excuse for their unwillingness to hand over these forest patches to the British forest administration.

Unlike the *devarakadus* of Kodagu district, the communities in Shimoga and Uttara Kannada were unable to assert their traditional rights over *kan*s officially. In spite of this lack of official recognition, people continued to conserve these forests in the names of local deities. Over time, this tradition eventually got restricted to the area immediate to the deity and protection diminished in the larger forest tracts surrounding the location of the deity (Chandran and others 1998). With the nationalization of forests, the larger forest tracts became part of the management regimes of the Forest Department. Today, while we find that *kan* forests are managed under the JFPM program in a few places, for the most part, we find that *kan* forests are often not considered in the preparation of micro-plans: even though these forests are officially under JFPM jurisdiction (Gokhale 2004). Thus, the Joint Forest Management scheme of the state Forest Department has totally neglected the dependence of local people on *kan*s. The emphasis of the scheme is on converting degraded lands under plantations, and the potential they have for yielding good revenue due to the presence of spices and other valuable nontimber forest products such as *Piper nigrum*, *Cinnamomum malabathrum*, *Artocarpus gomezianus*, *Zanthoxylum rhetsa*, and *Z. ovalifolium* is often ignored.

Property Rights

These forests are traditionally managed by specific communities whose deities are located in *kan*s, with limited extraction of spices and other nontimber forest products for sale. However, this has changed in recent times with state takeover of these forests and the leasing of extraction rights to local contractors. Thus the rights to withdrawal are rather varied, depending on the local situation. Traditionally, the local community manages the forest, and retains the rights to exclude as well as the authority to transfer this exclusion to include or exclude other groups of people. Again, this situation is changing as more of these forests are getting taken over by the state (Gokhale 2004). The community lacks the right to alienate, however. Thus we see that the property rights in this management system are in considerable flux, with much variation from one forest patch to another. The communities utilizing *kan* forests were traditionally more like authorized proprietors, and are now moving to a situation where they are at best authorized claimants.

Impact on Forests

The historical abuse of the *kan*s by the state and the efforts to detach the local people from the nearby resources have led to an overall decline in biodiversity. Even today, however, the biodiversity levels in *kan* forests remain higher than in surrounding areas, with wild pepper and other spice and nontimber forest plants, dense forest canopies, and a high percentage of evergreen species. Due to centuries of careful management, these forest patches often act as reservoirs for the preservation of rare and endemic species, found only in the *kan* patches, and absent outside the *kan*s.

With the diminishing influence of the sacred values associated with the local deities inside the forest, the present day relationship of people with the larger forest tracts is mainly through the generation of supplementary income from the sale of nontimber forest products. The Forest Department conducts the extraction of valuable nontimber forest products and spices like cinnamon bark and leaves with the help of contractors. This has led to the destructive extraction of these forest products, destroying the long standing conservation practices in these evergreen forests of the Western Ghats (Gokhale 2002, 2004).

Conclusions

The two countries we study, Nepal and India, have had very different histories, with India's colonization by the British resulting in a much earlier initiation of nationalization of forests. Colonial history has had its mark on forest institutions, more so in India than in Nepal. The British Empire, which occupied large parts of India and made

sporadic attempts to occupy regions of Nepal, spawned a large bureaucratic structure, the Forest Department, which nationalized and brought under its control all forested land. Existing institutions of forest management lost their rights to official recognition, and have not regained their independence even under ongoing initiatives towards decentralization. In Nepal, forests were nationalized in the early 1950s. The view of the Indian and Nepali forest departments borrows from the European forest managers' view, of forests as a resource that needs to be harvested. The contrast between this and the indigenous users' perception, of the forest as a living resource with spirits, gods, and a variety of resources, to be used but also protected for future generations, can and does lead to significant conflicts.

There is a widely held perception that forest management in Nepal is far more participatory than in India. Nevertheless, it is hard to make generalizations about policy implementations in the Indian subcontinent, with the variation in topography, climate, vegetation, land use, languages and ethnicities encountered in this region. In Nepal, we find significant variation between the different categories of forest management. On a gradient of involvement of local actors, we find that community forestry is the most participatory, while the authority of leasehold and buffer zone user groups are limited in rather different ways. Leasehold users are drawn from poorer sections of society, and by definition tend to be the more marginalized of households. Their rights to withdraw products, manage their forests, and exclude outsiders are severely limited due to the high degree of social conflict with nearby community forest members. The few situations where we have observed successful implementation of leasehold forestry are a result of the communities having resolved this level of internal conflict. Thus, while the state might not exert overt control over these forests, the manner in which the program was devised has obvious limitations.

In the buffer zone program, on the other hand, the state limits the degree of effective community control over the forest. While we do find that several areas have shown rapid improvement in forest cover, this is limited to those forests which have received extensive technical and financial input from external aid agencies and from the state, and which are located near the park main gate. The management guidelines are formulated and handed over to the communities, and they indicate that they have almost no control over modifications to fit local conditions. Thus, we find in accordance with Agrawal and Ostrom (2001) that there has been almost no change in the property rights regimes within which buffer zone communities function after the implementation of this program in Nepal. Promisingly, however, our recent field studies indicate that, despite the conclusion of UNDP support for the buffer zone program, several buffer zone communities have managed to function well and protect their forests under some rather difficult conditions of violence and insecurity (Nagendra 2007b).

In India, the vast extent of the Joint Forest Management program and variation in the form in which it has been implemented in different States leads to a variability in its impact on forests and people's rights (Sundar 2000). In Karnataka, we evaluate the regional version of the program, JFPM. The program is devised along lines similar to the community forestry program in Nepal, but there are crucial differences. The community has much fewer rights over the extraction and sale of timber and nontimber forest products for commercial purposes. As with all the state initiated programs in Nepal, the state retains the right to dissolve and deregister the community groups at any time. The rapid expansion of this program in recent years has been largely driven by external funding. The trend towards planting monoculture plantations of exotic water-hungry species such as *Acacia* and *Eucalyptus* in several parts of India is somewhat different from the situation in Nepal, where, at least in recent years, a mixture of local, useful species of trees is often planted to reclaim degraded lands (Nagendra 2002, 2005b).

The *betta* system originated in response to local needs of horticulturists in British India in the 1920s and 1930s. In the current context this has led to the propagation of an unequal system of rights and access, and given rise to significant social conflict. Nevertheless, in many parts of Karnataka the *betta* forests are in better condition compared to nearby state controlled forests. The historical sacred forests or *Kans* are clearly visible on the ground as dense, species-rich evergreen patches, which act as refugia for several rare, endangered species. This is also the management regime with the greatest level of participation by the local community, which has evolved these systems of forest management over centuries. Thus we find that there is a close association between the amount of flexibility granted to local users in adapting management approaches to fit local ecological and social conditions, and the outcome in terms of forest condition.

In contexts across the world, and countries as far flung as Mexico, Brazil and Madagascar, recent evidence clearly indicates the potential for communities to successfully manage forests and encourage protection and regeneration, when provided appropriate conditions (e.g. Bray and others 2005; Nepstad and others 2006; Elmqvist and others 2007). In South Asia, where local biophysical, social, economic, and cultural conditions vary so markedly from one region to the next, allowing communities the flexibility to adapt management policies to local conditions is a crucial factor that impacts their success (Gautam and others 2002, 2004; Varughese and Ostrom 2001). The fact that communities

do not have the required flexibility to incorporate context-specific learning into their management activities indicates problems for the future (Dietz and others 2003). Unfortunately, while national and state governments continue to exercise strict control over forest management and monitoring, and as "one size fits all" rules continue to be applied across larger regions with little scope for adaptation to fit local circumstance, a full exploration of the potential of true community based approaches for forest management appears unlikely.

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